

STUDIES IN THE GENERA OF THE *DIOSMEAE* (RUTACEAE): 4.

ION WILLIAMS

(*Compton Herbarium, Kirstenbosch*)

ABSTRACT

A recent inspection of Type material in Europe has led to the publication of some changes in nomenclature. Two names are rejected. Three new combinations and one new name are proposed. Two new species from the Swellendam/Bredasdorp area are described.

UITTREKSEL

STUDIES IN DIE GENERA VAN DIE *DIOSMEAE* (RUTACEAE): 4

'n Ondersoek in die jongste verlede van die tipe materiaal in Europa het aanleiding gegee tot die publikasie van sekere veranderinge in die nomenklatuur. Twee name word verwys. Drie nuwe kombinasies en een nuwe naam word voorgestel. Twee nuwe soorte uit die Swellendam/Bredasdorp gebied word beskryf.

***Diosma rubra* L. Sp.pl. 1:198(1753) nom.rejic.**

Coleonema rubrum (L.) Druce in Bot. Soc. Exch. Club 1916. :616(1917) nom. rejic.

Diosma foliis setaceis acutis. L. Hort. Cliff. :72(1737).

Under *Diosma* in the *Hortus Cliffortianus* (1737), Linnaeus described three plants. The first of these was actually in cultivation in Clifford's garden and he described it in great detail. The second and third were based upon figures in existing literature published by the authors Plukenett, Commelin and Seba. It would appear that Linnaeus, at that time, had no access to the actual plants depicted and described by these authors. In the *Species Plantarum* ed. 1 (1753) he divided the third species of *Diosma* which he had described in the *Hortus Cliffortianus* into two parts, designating the first polynomial as a synonym of *Diosma rubra* and the second polynomial as a synonym of *Diosma ericoides*.

One of the polynomials cited by Linnaeus under *D. rubra* is *Spiraea odorata, floribus suaverubentibus*. Comm. Rar. : 2.t.2 (1706). This is a species of *Agathosma* (quite probably *A. serpyllacea* Licht.) and suggests that this is from where he obtained the epithet *rubra*.

It seems reasonable to suppose that Linnaeus was in possession of some dried plant material when he described his *Diosma rubra* as *Diosma folis linearibus*

acutis glabris subtus bifarian punctatis in 1753. This is supported by Sheet No. 270/4 in Linnaeus' herbarium marked *rubra* 3. in his own handwriting. Pinned to this is an exact duplicate, Sheet No. 270/5, without inscription. The following Sheet No. 270/6 bears a specimen collected by Sparrmann received by Linnaeus a long time after 1753 and the following three sheets, all without inscriptions, may have come from the Tulbagh collection or from Burman and so were also received after 1753. Thus the only sheet which has any bearing on typification of *D. rubra* is Sheet No. 270/4. Mounted on this sheet are two specimens, the one on the left hand side being a twig of *Coleonema album* and that on the right hand side, partly superimposed, being a twig of *Diosma hirsuta*. Both of these specimens are exactly as described by Linnaeus' diagnostic phrase and so we must conclude that Linnaeus regarded these plants as being conspecific. The name *Diosma rubra* is therefore rejected under Article 70 of the Code, as it is based upon a type consisting of two entirely discordant elements neither of which can be selected as a lectotype. For the same reason the combination *Coleonema rubrum* (L.) Druce is also rejected.

It is interesting to note that the cultivated specimen of *D. hirsuta* from Clifford's garden is extremely pubescent whereas specimens of *D. hirsuta*, such as *D. rubra* ex parte in Linnaeus' herbarium, from the wild are all very much more glabrous although the degree of pubescence may vary considerably. This evidently misled Linnaeus into thinking that they were different plants.

In England *Coleonema album*, the other element in *Diosma rubra* L. in Linnaeus' herbarium, was in cultivation and was commonly known as *D. ericoides*. Salisbury (1796) proposed substituting *D. juniperifolia* for *D. rubra* L. stating: "Commonly known in gardens as *D. ericoides*. A light green herb, with white flowers, wherefore the Linnaean naming is the worst".

***Diosma oppositifolia* L. Sp.Pl. 1: 198 (1753).**

Iconotype: *Spiraea Africana foliis cruciatim positis*. Fig. 1. Comm. Hort. Med. Amst. (1706).

D. succulenta Berg. Descr. Plant. Cap.: 63 (1767) excl. syn. Pluk. Type: in Bergius' Herbarium (S-BT).

D. scabra Lam. Encycl. Meth. Bot. 2: 283 (1786). Type: Without locality, collector or number; labeled *Diosma scabra* Lam. Dict. (P-LA). Lamarck states; "This plant grows at the Cape of Good Hope and it was received from Mr. Sonnerat together with most of the other specimens mentioned below".

D. decussata Lam. Encycl. Meth. Bot. 2: 284 (1786). Type: Without locality, collector or number; right hand specimen on sheet in Herb. Lamarck (P-LA).

D. rigidulum (or *rigidum*) Willd. Enum. Plant. Supp.: 12 (1813). nom. nud.

D. succulenta Berg. var. *bergiana* Sonder in Flor. Cap. 1: 373 (1860).

PRE-LINNAEAN CITATION: *Spiraea Africana foliis cruciatim positis*. Comm. Hort. Med. Amst.: 1 (1706). 2. *Diosma foliis subulatis acutis* L. Hort. Cliff. :71 (1737) ex parte.

ICONES. *Spiraea* . . . Comm. Hort. Med. Amst. t.1. (1706); *D. succulenta* Wendl. Coll. Plant. t.1. (1805).

A recent examination of both Clifford's herbarium and Linnaeus' herbarium have shown that, up to the time in 1753, when he proposed the name *Diosma oppositifolia*, Linnaeus had never seen a specimen of the plant currently known as *D. succulenta* Berg. This is quite clearly shewn in his own herbarium where he tried to fit the name *oppositifolia* to the plant on Sheet No. 10 and then crossed it out and put its name on Sheet No. 1 which was also in error as the plant on that Sheet is *D. hirsuta* L. Of the two Sheets which actually bear twigs of *D. succulenta*, No. 2 bears the name *oppositifolia* in his son's handwriting (fide Jackson) and No. 21, without any name, was received from Sparrmann much later than 1753.

If we consider the *Hortus Cliffortianus*, the only *Diosma* described at length was one that was actually growing at that time in Clifford's garden. The other two descriptions were based upon illustrations that had appeared in literature before 1737. Of these there is no relevant specimen to be found in Clifford's herbarium.

One must conclude, therefore, that the name *D. oppositifolia* L. is based upon literature and consider the merits of the polynomials cited by Linnaeus.

At first it is significant that Linnaeus amplified his name phrase from that in the *Hortus Cliffortianus* by adding the word *oppositis*. His description, in Sp. Pl. 1, reads *oppositifolia*. 1. *Diowma foliis subulatis acutis oppositis*. This agrees exactly with the illustration *Spiraea Africana foliis cruciatim positis*: Fig. 1 in Commelin (1706) which is the first polynomial cited by Linnaeus. Furthermore there can be no doubt whatever that the plant described and depicted by Commelin, and formerly cultivated in Amsterdam, was what is currently known as *D. succulenta* Berg.

The second polynomial cited by Linnaeus *Hypericum africanum vulgare* of Seba is *D. hirsuta* L. This is a plant in which the leaves are alternate, never opposite. One can therefore say that the description of *D. oppositifolia* applies to the first polynomial which is Commelin's drawing and not to the second polynomial which is Seba's drawing. Under articles 53 and 70 of the Code, Commelin's plate is therefore selected as the *Icono-lectotype* of *D. oppositifolia* L. and the name *D. succulenta* Berg. is reduced to synonymy.

In the *Flora of the Cape Peninsula* (1950) Miss E. E. Esterhuysen upheld the name *Diosma oppositifolia* L. and placed *D. succulenta* Berg. in synonymy.

***Diosma apetala* (Dümmer) Williams, comb. nov.**

Acmadenia apetala Dümmer in *Fedde Repert.* **11**: 121 (1912). Type: South Africa, on moist and stony mountain places near Vrolykheid, 1 200–1 500 m, on the Great Zwartbergen (August), *Drège* 2250 (K, holo.).

Diosma bolusii Glover in *Ann. Bol. Herb.* **1.3**: 26 (1915). Type: Cape Province: South Western Region; on rocky slopes of the Zwartberg Mountains in the Zwartberg Pass, Prince Albert Div., *H. Bolus* 11460 (BOL, holo.).

ICON: Glover loc. cit. **1.3.t.15.f.c** (1915).

A recent inspection of Dümmer's type at Kew has shown that it exactly matches *Diosma bolusii* Glover. This is a fairly well-known species of which several gatherings have been made. A unique character of this plant is that the petals never unfold as is in a normal flower, but remain coherent forming a small cap which falls away when the flower opens. The calyx lobes are by then widely spread, pale in colour and give a 5-petaled appearance to the minute flower. In Dümmer's specimen the petals had already delapsed and he was therefore misled into thinking this flower to be apetalous.

With regard to the generic status of this plant, it would appear that the presence of staminodes led Dümmer to place it in *Acmadenia*.

In specimens of *Diosma* so far examined 9 different species were found to have no trace whatever of any staminodes and 5 different species were found to

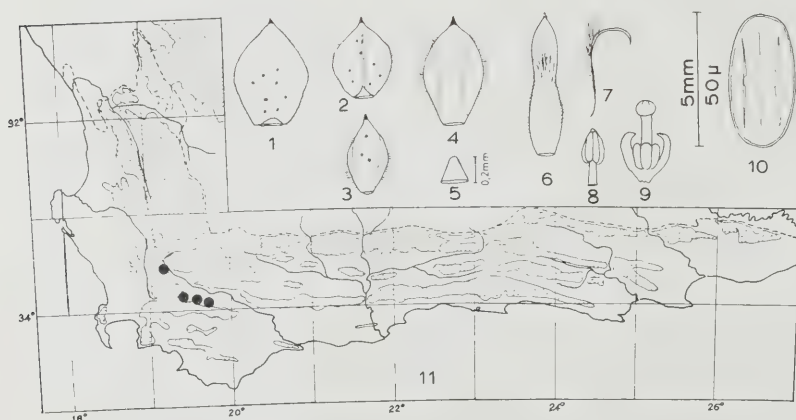


FIG. 1.

Euchaetis pungens: 1, leaf. 2, bract. 3, bracteole. 4, calyx lobe. 5, staminode. 6, petal. 7, side view of petal. 8, anther. 9, gynoecium. 10, pollen. 11, distribution.

have staminodes that were vestigial, being represented by a minute sessile hemispherical gland ranging in size from 0.10–0.25 mm in diameter. The species here under discussion was found to be unusual in having staminodes that were minute glands, spherical in shape about 0.15 mm in diameter. This difference is so slight however as scarcely to warrant placing this species in another genus. The widely open flower with its cup shaped 5-lobed disc has very much the appearance of *Diosma*. It is not in the least like *Acmadenia* in which the reproductive parts are more or less concealed by the claws of the petals. This plant is also very similar in general appearance and habit to several other species of *Diosma* notably *D. guthriei*, *D. ramosissima* and *D. passerionoides*.

Collections from widely spread areas in the Little Karoo from the Roodeberg to the Kougaberg, of a species resembling *D. ramosissima* also closely resemble *D. bolusii* in having the same spherical staminodes but these plants all retain their petals when flowering.

There seems to be no doubt that *Acmadenia apetalata* Dümmer should be placed in *Diosma* and, as Dümmer's epithet has priority of publication, it is found necessary to make the new combination *Diosma apetalata* (Dümmer) Williams.

***Euchaetis pungens* (Bartl. & Wendl.) Williams, comb. nov.**

Acmadenia pungens Bartl. & Wendl. *Diosmeae* in Beitr. Bot. 1:64 (1824). Type: L. hand specimen on Sheet No. 4784 in herb Willdenow, received from Jacquin (B, holo. W, iso). Note: at Vienna there are four sheets of isotypes of this species collected for Jacquin by Scholl at the Cape of Good Hope.

SPECIMENS EXAMINED

CAPE—3319 (Worcester): (-CA) In montibus pone Bainskloof, 2 500 ft. 5/2/1897 *Schlechter* 10260 (BM, BOL, PRE); Darling Bridge, 14/9/1941 *Esterhuysen* 6094 (BOL); Romans River, 17/11/1941 *Compton* 12508 (NBG); (-CB) North end Dutoitskloof in sand amongst rocks, 25 2/1952 *Esterhuysen* 20114 (BOL); (-CD) In arenosis prope Brandvlei, 1 000 ft. 8/1/1896 *Schlechter* 9922 (BM, BOL, K, P, PRE, BR, W); Slopes of Brandvleiberg, - 6/1940 *Esterhuysen* 1924 (BOL, K, NBG, SAM); Brandvleikop, 2/6/1940 *Bond* 368 (NBG); Hill near Moordkuil, Bosjesveld, 1 000 ft. 24/10/1828 *Drège* 7152 (P); Moordkuil, S. end of Quaggaskloof Dam, 700 ft. 11/5/1973 *Williams* 1797 (NBG). Without precise locality: *Scholl s.n.* (B-W 4784 L.H. spec., MEL, W); *Thunberg s.n.* (UPS-TH 5716 as to a and b only); Hottentots Holland (loc. doubtful), *Günzlin s.n.* (MEL, W 311).

The collection of fresh material at Moordkuil in the Worcester Division during 1973 made possible a detailed examination of this plant and revealed

that it could be more satisfactorily placed in *Euchaetis* than in *Acmadenia*. Characters pointing to this are: (1) the strongly bearded petals which completely hide the anthers and stigma; (2) the very short filaments and style which keep the anthers and stigma within the surrounding bearded petals; (3) the staminodes which are either absent or at most 0.2 mm long; (4) the anthers which possess a very small apical gland.

***Euchaetis diosmoides* (Schltr.) Williams, comb. nov.**

Acmadenia diosmoides Schltr. in *Bot. Jb.* **24**: 439 (1898). Type: Western Cape: On sandy places near Elim, 100–150 m above sea level, flowering on 20th April 1896. *Schlechter 7654* (BOL, lecto.; BM, K, P, PRE, W).

SPECIMENS EXAMINED

CAPE—3419. (Caledon): (-DA) 2,5 km S. of Viljoenshof, Bredasdorp Div., 300 ft, 13/11/1971 *Williams 1593* (NBG), 30/1/1973 *Williams 1755* (NBG); (-DB) Elim, 400 ft, 20/4/1896 *Schlechter 7654* (BM, BOL, K, P, PRE, W); In hills near Elim, 300 ft, -'12/1896 *H. Bolus 8531* (K); 2,4 km S. of Elim, Bredasdorp Div., 250 ft, 13/11/1971 *Williams 1592* (NBG).

The gathering of fresh material in 1971 and again in 1973 has provided the opportunity for making a close inspection of this plant. The petal, with a markedly transverse beard, immediately places this species into the genus *Euchaetis*. Other characters which support this are the presence of vestigial staminodes, the capitate stigma and the five-chambered ovary. It is hard to

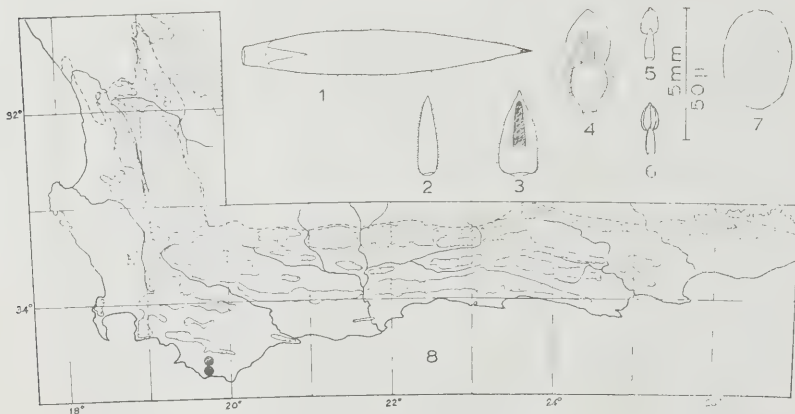


FIG. 2.

Euchaetis diosmoides: 1, leaf. 2, bracteole. 3, calyx lobe. 4, petal. 5, anther—dorsal view. 6, anther front view. 7, pollen. 8, distribution.

visualise what persuaded Schlechter to place this plant with *Acmadenia*. He compares it with two other species; *Acmadenia rosmarinifolia* Bartl., which has been found to be more satisfactorily placed in *Agathosma*, and *Acmadenia laevigata* Bartl. & Wendl., (= *Acmadenia assimilis* Sond.)

Euchaetis diosmoides is most closely related to *Euchaetis schlechteri* Schinz and it is interesting to note that both these plants are found growing in brownish loamy soil which is rather unusual in this genus.

There is a certain amount of confusion in the typification of this species that needs to be clarified. Schlechter published the two names *Euchaetis longibracteata* and *Acmadenia diosmoides* at the same time in Engler's *Botanische Jahrbuch* (1898). His descriptions exactly match his material, with labels correctly named in his own handwriting, duplicates of which are to be found in many herbaria. However in the published work the specimens cited relative to each species have been transposed. This must be regarded as a typographic error and these species are then correctly typified as follows:

Euchaetis longibracteata Schltr. Type: Western Cape: on stony hills near Elim, 80 m above sea level, flowering in April 1896. *Schlechter* 7627 (BOL, lecto.; BM, K, P, PRE, W).

Euchaetis diosmoides (Schltr.) Williams. Type: Western Cape: On sandy places near Elim, 100–150 m above sea level, flowering on 20th April 1896. *Schlechter* 7654 (BOL, lecto.; BM, K, P, PRE, W).

Together with his 7627 from near Elim Schlechter also cites his 7586 "from a few places in the mountains at Houw Hoek, at 600 m above sea level". Unfortunately it has been impossible to trace any material relating to this gathering. The locality is a long way from Elim and one would not expect to find this plant at Houw Hoek.

Acmadenia sheilae Williams, nom. nov.

Acmadenia gracilis Compton in *J. Bot., Lond.* **70**: (1932) nom. illegit. Type: Cape Province; Ladismith Division, Roodeberg, near Van Wyk's Dam, 4 000 ft., 1/11/1931, *Compton* 3859 (BOL, holo.; K. iso.); non *Acmadenia gracilis* Dümmer in *Fedde Repert.* **11**: 163 (1912).

SPECIMENS EXAMINED

CAPE—3320 (Montagu): (-DB) Touwsberg, 3 000 ft., 1/6/1956 *Esterhuysen* 25907 (BOL), 19/8/1956 *Wurts* 1455 (NBG); 3321 (Ladismith): (-AD) Seven Weeks Poort, -9/1928 *Pocock* 1005 (BOL); 12/10/1955 *Esterhuysen* 24758 (BOL), 30/3/1959 *Esterhuysen* 28291 (BOL), 7/5/1963 *Wurts* 4711 (K, PRE, STE), 10/7/1903 *Marloth* 3222 (PRE), -9/1912 *Thomas* 1416 (K, PRE), Swartberg beyond Seven Weeks Poort, -12/1930 *Muir* 4608 (K, PRE); Bushbuckkloof Pass, 3 500 ft., 14/11/1938 *Hall* 55 (BOL); (-CB) Zwart Mt. S. of Amalien-

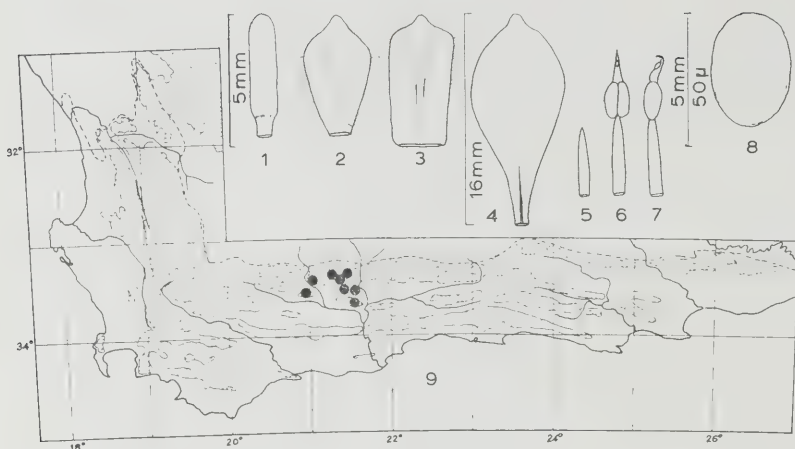


FIG. 3.

Acmadenia sheilae: 1, leaf. 2, bract. 3, calyx lobe. 4, petal. 5, staminode. 6, anther—front view. 7, anther—side view. 8, pollen. 9, distribution.

stein, 29/11/1926 *Liebenberg* 708 (PRE): (-DA) Gamka Pass near Calitzdorp, 24/5/1950 *Esterhuysen* 17126 (BOL, K, NBG): (-BC) Paardeberg, Huis River Pass, 23/5/1950 *Esterhuysen* 17114 (BOL): (-AC) Buffelsrivier Poort, W. Klein Swartberg, 2 500–3 200 ft, 26/4/1973 *Williams* 1790 (NBG): (-DA) Roodeberg (Rooiberg), 4 000 ft., 1/11/1931 *Compton* 3859 (BOL, holo.; K, iso.), -/3/1940 *Lewis* 1755 (SAM), 18/8/1954 *Wurts* 1299 (NBG); Roodeberg, 8/8/1949 *Barker* 5490 (BOL, NBG), 24/5/1950 *Esterhuysen* 17176 (BOL), 24/3/1940 *Kies* 223 (NBG), 8/8/1949 *Barker* 5503 (NBG); Roodeberg Pass, 2 000–2 600 ft, 4/7/1948 *Acocks* 14618 (K, PRE), 15/3/1959 *Acocks* 20359 (K, NBG), 19/7/1954 *Rycroft* 1645 (NBG), 17/9/1967 *Rourke* 857 (NBG), 30/10/1971 *Williams* 1573 (NBG), 23/8/1969 *Rycroft* 3034 (NBG), 19/7/1954 *Lewis* 4725 (SAM), 6/10/1971 *Oliver* 3677 (STE).

A recent inspection of Dümmer's type material at Kew has shown that *Acmadenia gracilis* Dümmer should really fall within the concept of *Acmadenia trigona* (Ecklon & Zeyher) Druce. This species shows a certain amount of variation. Plants with the smallest leaves, such as those shown by *A. gracilis* Dümmer, are found at the southern end of its range of distribution near the Robinson Pass. At the western end, near Garcias Pass, plants are found with much larger leaves. The specimens of Ecklon & Zeyher are somewhat intermediate in size and were found more towards the centre of this area of distribution. These leaves are characteristically somewhat trigonal with a very acute

apex. On the other hand the leaves of *A. gracilis* Compton are terete, obtuse and very much smaller. It is obviously a very different plant and is found on the Roodeberg and Swartberg mountains.

Acmadenia gracilis Compton is a homonym of *A. gracilis* Dümmer and must be rejected. As a new name the epithet *sheilae* has been chosen in honour of my wife whose invaluable assistance in my work merits a lot more than just this simple tribute.

Acmadenis laxa Williams, sp. nov., propria propter folia obtusa opposita, flores singuli foliis bractisimilis binatim basim cingens, antherae apice minute glanduliferae.

Type: CAPE—3420 (Bredasdorp): (—AB) Bontebok National Park, Swellendam, 110 m, 27/7/1973 *Williams 1828* (NBG, holotype; M, MO, PRE, S, STE, isotypes).

Acmadenia obtusata sensu Bartl. & Wendl. Diosm. in *Beitr. Bot.* **1**: 63 (1824).

Frutex c. 20 cm, lusus, ad basim ramificans. *Rami* brevi, graciles, oppositi, puberuli. *Folia* 4–8 mm longa, 1–2 mm lata, opposita, quadrifaria, adpressa, erecta, lanceolata, obtusa, sessila, ciliata, complicata vel canaliculata, sparse pubescentia, obscure punctulata. *Flores* 15 mm diam., singuli, terminali, rosei, foliis bracti similis binatim basim cingens. *Bracteae* bini, 3.5 mm longae, 2.5 mm latae, adpressae, orbiculares. *Bracteolae* bini, 4 mm longae, 3 mm latae, orbicu-

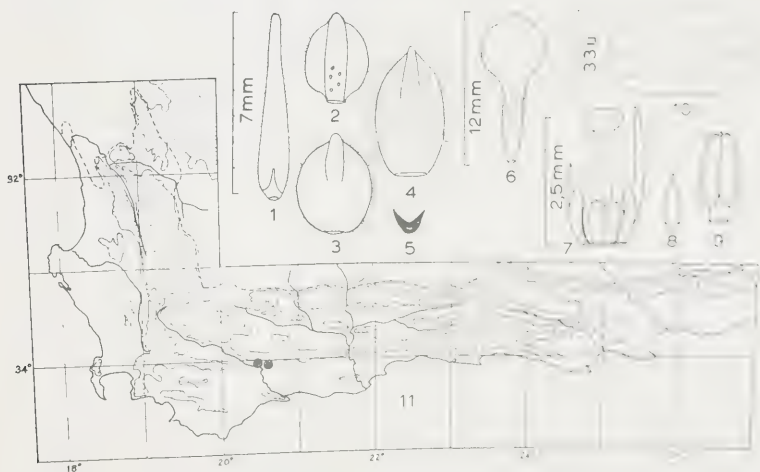


FIG. 4.

Acmadenia laxa: 1, leaf. 2, bract. 3, bracteole. 4, calyx lobe. 5, cross section of leaf. 6, petal. 7, gynoecium. 8, staminode. 9, anther. 10, pollen. 11, distribution.

lares, apiculatae, ciliatae. *Sepala* quinque, 5 mm longa, 2,8 mm lata, elliptica, apiculata, pubescentia, ciliata, rosea. *Petala* quinque, 12 mm longa, 5,2 mm lata, rosea, ciliolata, obtuse apiculata, unguibus angustis pubescentibus. *Staminodia* quinque, 1 mm longa, apice minute glandulifera. *Fila* quinque, glabra, post anthesin 2 mm longa. *Antherae* quinque, ante anthesin 1,5 mm longae, 0,8 mm latae, minute glanduliferae. *Pollen* 60μ longum, 33μ diam., oblongum. *Stigma* 0,8 mm diam., capitatum. *Stylus* glaber, 1,7 mm longus. *Ovarium* quinque—carpellatum, 0,8 mm diam. *Fructus* quinque-carpellatus, 7 mm longus, 5 mm diam., glaber, cornibus brevibus 1 mm longis. *Semen* 3,5 mm longum, 1,5 mm latum, piceum, nitens.

This species, which occurs in the vicinity of the town of Swellendam, has been known for many years having been collected by Roxburgh, Burchell, Zeyher, Drège and many others. When Bartling and Wendland published the combination *Acmadenia obtusata* (Thunb.) B. & W. in 1824 they had apparently never examined the type of *Diosma obtusata* Thunb. in Thunberg's herbarium but based their accompanying description upon a plant in Willdenow's herbarium which Willdenow had erroneously labeled as *Diosma obtusata*. Consequently, specimens of *Acmadenia obtusata* sensu B. & W. are not conspecific with *Acmadenia obtusata* (Thunb.) B. & W. but are of another taxon which is here described *de novo*.

Shrubs about 20 cm tall, lax, branching from near the base with a tough rootstock. *Branches* short, slender, frequently opposite, pubescent with matted erect hairs, well clothed with leaves at first. *Leaves* of very young plants spreading-erect, soon becoming adpressed-erect, 4–8 mm long, 1–2 mm broad, opposite, 4-ranked, lanceolate, obtuse, sessile, ciliate, complicate or canaliculate, sparsely pubescent, obscurely gland-dotted. *Flowers* 15 mm diam., solitary, terminal, pink. Towards the flowers the pairs of leaves gradually become bract-like. *Bracts* two, 3,5 mm long, 2,5 mm broad, adpressed, orbicular with a blunt point at the apex, very sparsely pubescent, margins broad translucent and ciliate, midrib prominent bearing small gland-dots. *Bracteoles* two, 4 mm long, 3 mm broad, orbicular, apiculate, sparsely pubescent above, margins broad translucent and ciliate, midrib prominent and green towards the apex. *Calyx lobes* five, 5 mm long, 2,8 mm broad, elliptic, apiculate, somewhat pubescent, strongly ciliate, margins broad translucent and pinkish. *Petals* five, 12 mm long overall with the limb 7,5 mm long, 5,2 mm broad, sub-orbicular, apex with an obtuse point, narrowed to the base, pink, ciliolate, sparsely and minutely pubescent on the upper side, minutely pubescent with a few gland dots on the underside; the claw 4,5 mm long, 1,5 mm broad, pubescent on both surfaces and ciliate at the throat of the flower, narrowed and glabrous below. *Staminodes* five, 1 mm long, glabrous, fairly stout with a pointed gland 0,2 mm long at the apex. *Filaments* five, becoming 2 mm long, acicular, erect, glabrous. *Anthers*

five, before anthesis 1,5 mm long, 0,8 mm broad, wine coloured with a minute apical gland. Pollen 60 μ long, 33 μ diam., oblong. Disc exceeds the ovary, strongly surrounds the stigma at first, dark green, exudes nectar. Stigma 0,8 diam., capitate, depressed globose, green, becoming sticky. Style becoming 1,7 mm long, terete, glabrous, erect. Ovary 5-carpellate, 0,8 mm diam., sparsely pubescent at the sides. Fruit 5-carpellate, 7 mm long, 5 mm diam., glabrous; horns short, about 1 mm long. Seed 3,5 mm long, 1,5 mm broad, black, shining.

SPECIMENS EXAMINED

CAPE—3420 (Bredasdorp): (-AB) Hills near Swellendam, 500–1 000 ft., -/7/1887 *F. Bolus* 618 (BM, BOL, K, P, SAM, W), 7/9/1924 *Compton* 3448 (BOL), 5/9/1955 *Esterhuysen* 24622 (BOL), 22 1 1815 *Burchell* 7438 (K), 11/10/1910 *Pappe* s.n. (MEL), 22/5/1952 *Wurts* 126 (NBG), 2/7/1952 *Wurts* 211 (NBG), 3/9/1964 *Rothman* s.n. (NBG), 27/7/1973 *Williams* 1827 (NBG), -/7/1900 *Fry* s.n. (*Galpin* 4989, PRE), -/10/1918 *Marloth* 8035 (PRE), 27/9/1926 *Marloth* 12592 (PRE, STE), -/10/1869 *Kennedy* s.n. (*Macowan* 1704, SAM), -/10/- *Lamb* 2226 (SAM); Bontebok Park, 350–500 ft., 23 8 1965 *Grobler* 462 (K, PRE, STE), 27/7/1973 *Williams* 1828 (NBG, holotype; M, MO, PRE, S, STE, isotypes), 20/6/1962 *Acocks* 22226 (PRE), -/9/1962 *Liebenberg* 6590 (PRE, STE): (-BA). On both sides of the Buffeljagsrivier from Swellendam to Rietkuil, -/9/- *Zeyher* 2160 (GOET, K, MEL, P, PRE, SAM, W); Sparrbosch 25/7/1831 *Drège* 7114 (BM, K, P, PRE, W). Without precise locality, *Roxburgh* s.n. (BM). Without collectors name or locality, (B-W4785/2, lecto.), (LD 106).

DISTRIBUTION AND BIOLOGY

Acmadenia laxa occurs in a very small area, probably not more than fifteen kilometres long by five kilometres broad, on hills in the vicinity of Swellendam and Buffeljagsrivier. Plants are found growing at altitudes varying from 100–300 m (350–1 000 feet) on dry, stony, gravelly or shaly ground probably derived from the lower series of the cretaceous system which occurs as a small outlier in this area. Flowering appears to take place from June until October with seeds probably ripening until January. The claws of the petals are pubescent and bulged inwards at the throat of the flower with the result that the reproductive parts, including the disc which secretes nectar, are completely concealed within a small chamber. The petals are widely spread and provide a conspicuous display no doubt in order to attract insects to the flower. The anthers ripen and are stripped of their pollen before the style elongates and raises the stigma up to the vicinity of the empty anthers. The pollen is sticky and does not fall down upon the stigma when the anther ripens. This plant would therefore appear to be pollinated by insects but one wonders whether, in the absence of insects, it could not become self-pollinating. The slippery ripe seeds are ejected by a cata-

pult mechanism which ensures a certain degree of dispersal. The plants appear to coppice from the root which means they may survive light veld fires or grazing by animals.

This species possesses the following generic characters. (1) The *flowers* are solitary. (2) The *petals* are pubescent and bulged inwards at the throat. (3) *Staminodes* are present, being 1 mm long. (4) *Anthers* bear a minute apical gland which is perhaps not typical. (5) The *disc* is well developed and exceeds the ovary. (6) The *Stigma* is capitate. (7) The *style* is short and erect. (8) The *filaments* and *style* are glabrous. (9) The *ovary* is 5-carpellate. (10) The *fruit* is short-horned.

With the exception that the anther bears only a minute apical gland instead of something rather larger, this plant appears to belong in the genus *Acmadenia* Bartl. & Wendl.

Acmadenia laxa is recognised as distinct on account of its having leaves that are opposite and obtuse, flowers solitary, with numerous pairs of bract-like leaves at the base of each, and anthers bearing a minute apical gland. It differs from *Acmadenia niveni*, *Acmadenia macropetala* and *Acmadenia sheilae* which have anthers with large pointed apical glands.

The epithet *laxa* is an allusion to the slender branchlets of this plant which are rather more lax in habit than those of *A. obtusata* (Thunb.) B. & W.

Euchaetis scabricosta Williams, sp. nov., propria propter folia opposita, ciliata, breviter petiolata, costis scabris monoseriati-punctatis, carpella cornibus erectis longis.

Frutex c. 30 cm, multicaulis. *Rami* recti, graciles, erecti vel laxi, tomentosi. *Folia* 5–10 mm longa, 2–2,5 mm lata, glabra, lanceolata, acuta, minute callosa, complicata, opposita, decussata, imbricata, erecta, marginibus hyalinibus, tenuibus, minute punctatis, ciliatis, ad basim breviter petiolata, costis scabris monoseriati-punctatis. *Bractea* una, folium simulans. *Bracteolae* duae, c. 4 mm longae, 1,5 mm latae, glabrae, ciliatae. *Sepla* quinque, 4 mm longa, 2,7 mm lata, apiculata, sub-orbiculata, ciliata. *Petala* quinque, 5,5 mm longa, 2,5 mm lata, alba vel sub-rosea, orbiculata, transverse barbata, unguibus ciliatis. *Staminoda* quinque, vestigialia. *Fila* quinque, glabra, post anthesin 2 mm longa. *Antherae* quinque, ante anthesin 1,3 mm longae, 0,8 mm latae, oblongae, roseae, apicibus minute glandulosis. *Pollen* 55 μ longum, 35 μ diam., oblongum. *Discus* ovarium excedens, viridus. *Stigma* c. 0,6 mm diam., capitatum. *Stylus* glaber, 1,3 mm longus. *Ovarium* 5-carpellatum, 0,9 mm diam., glabrum vel apicibus setulosus. *Fructus* 5-carpellatus, 8 mm longus, 5 mm diam., glaber, cornibus 2,5 mm longis, erectis. *Semen* 3,8–5 mm longum, 1,8 mm latum, piceum, nitens.

Type: CAPE—3420 (Bredasdorp): (–BC) Potberg, sandy flats on south side of mountain, 3 km from Potberg farm, Bredasdorp Division, 19/9/1972 Williams 1689 (NGB, holotype).

A specimen of this plant was collected by Harry Bolus on hills near Elim in 1894 and, together with later similar collections, was placed under *Acmadenia*

assimilis in the Bolus Herbarium. *Acmadenia assimilis* Sonder and *Euchaetis laevigata* Turcz are conspecific but refer to a species which may readily be recognised as differing from *Euchaetis scabriocosta* as it possesses very small orbicular leaves.

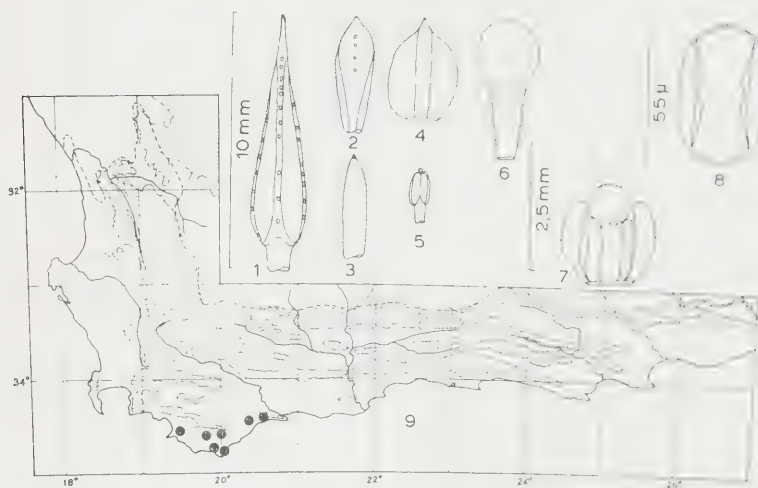


FIG. 5.

Euchaetis scabriocosta: 1, leaf. 2, bract. 3, bracteole. 4, calyx lobe. 5, anther. 6, petal. 7, gynoecium. 8, pollen. 9, distribution.

Shrubs about 30 cm tall with several slender stems occasionally arising from a fairly stout rootstock. *Branches* slender, straight, erect or lax, clothed with a short erect pubescence, hidden beneath the leaves. *Leaves* 5–10 mm long, 2–2.5 mm broad, glabrous, opposite, decussate, imbricate, erect, lanceolate, acute, with a small callus at the apex, margins ciliate, narrowly translucent and dotted with small glands, narrowed at the base to a short petiole, dorsal ridge prominent and glandular-serrate, adaxial surface deeply hollowed, complicate when dried. *Bract* one, leaflike, 4.6 mm long, 1.5–1.9 mm broad, glabrous, lanceolate, ciliate. *Bracteoles* two, about 4 mm long, 1.5 mm broad, glabrous, ciliate, somewhat asymmetrical with broad translucent margins. *Inflorescence* terminal in groups of up to 6 flowers which themselves may be aggregated into quite large clusters, each flower 6 mm diam., white or pink with the throat closed by a fringe of hairs. *Calyx lobes* five, 4 mm long, 2.7 mm broad, apiculate, sub-orbicular, margins ciliate and broadly translucent, midrib with or without a few hairs near the apex. *Petals* five, 5.5 mm long including the claw; *limb* 2.5 mm diam.,

orbicular; *claw* 3 mm long, 1,3 mm broad, transversely bearded above, laterally ciliate, narrowing to the base. *Staminodes* five, vestigial, a minute gland about 0,05 diam. *Filaments* five, becoming 2 mm long, glabrous, subulate. *Anthers* five, before anthesis 1,3 mm long, 0,8 mm broad, oblong, bilobed, purplish-red with a minute apical gland. *Pollen* ellipsoid, 55μ long, 35μ broad. *Disc* extends well over the ovary, green, fleshy, exudes nectar. *Stigma* about 0,6 mm diam., capitate, globose, green, viscid. *Style* becoming about 1,3 mm long, glabrous, ever-erect. *Ovary* 5-carpellate, 0,9 mm diam., glabrous or with a few hairs at the apices of the carpels. *Fruit* 5-carpellate, 8 mm long, 5 mm diam., glabrous, gland-dotted on both margins in the lower half; *horns* 2,5 mm long, erect, apices somewhat bifid clasping a minute gland. *Fruit* 3,8–5 mm long including the white aril, without the aril 2,8–4,3 mm long, 1,8 mm diam., black, shining.

SPECIMENS EXAMINED

CAPE—3419 (Caledon): (-CB) On road between Gansbaai and Napier ca. 6 m, 22/9/1938 *Gillet* 4333 (BOL); (-DB) On hills near Elim 300 ft., -/10/1894 *H. Bolus* s.n. (BOL 13713); Near Elim, 10,8.1949 *Steyn* 355 (NBG); Bredasdorp/Elim, 8.10.1950 *Compton* 22129 (NBG); Springfontein near Salt Pan, 50 ft., 1/8/1973 *Williams* 1831 (NBG). CAPE—3420 (Bredasdorp): (-CA) On hills near Bredasdorp, -/7/1895 *H. Bolus* s.n. (BOL); S. slopes of Bredasdorp Mt., 15/10/1951 *Esterhuysen* 19151 (BOL); (-CC) Northumberland Point, 150 ft., 13/10/1969 *Acocks* 24261 (K, PRE); Struisbaai, 50 ft., 21/6.1972 *Williams* 1660 (NBG); (-BC) Potberg, lower S. slopes, 18,9.1954 *Esterhuysen* 23207 (BOL, NBG); Potberg, stony sandy flats, 19,9/1954 *Esterhuysen* 23218 (BOL); Potberg, limestone hills, in sand, 19/9/1954 *Esterhuysen* 23254 (BOL); Potberg, limestone hills, rocky shelf, 19,9/1954 *Esterhuysen* 23312 (BOL); Sandy flats on S. side of Potberg, 450 ft., 19/9/1972 *Williams* 1689 (NBG, holo.); 3,3 km from Potberg farm, Potberg, 450 ft., 21/11/1973 *Williams* 1870 (NBG).

DISTRIBUTION AND BIOLOGY

Euchaetis scabricosta would appear to be a fairly rare plant. Until now it has only been found in the area lying between the Soetanyssberg and the Potberg. It does not occur in any great abundance but is rather sparsely scattered in one or two areas and can be quite easily overlooked. It is found at altitudes of from 15 to 140 m (50 to 450 feet) above sea level fairly near to the coast, growing in hard sandy soil not in deep soft soil nor on limestone. Flowering reaches a peak in September but seems to be spread over several months starting in June and ending in November. Fruits ripen mostly in November and December. At first glance it would almost appear that this flower, with its stigma and anthers in close proximity, completely hidden between the densely bearded petals, must be self-

pollinating. However the following factors may indicate that this is not the case: The disc exudes nectar apparently to attract insects. The limb of the petal spreads widely displaying a small but nevertheless obvious flower. The stigma is never really in contact with the anthers and the style lengthens to elevate the stigma only after the anthers have discharged their pollen. The pollen is somewhat sticky and does not fall upon the stigma when the anther splits open. In flowers examined, the pollen has all vanished by the time that the stigma has been raised to its highest position. The flowers are inhabited by small insects, up to 1,3 mm long, in various stages of development who apparently live on the nectar and pollen therein. These do not, however, appear to be the pollinating agents which must be very much larger. The seeds when ripe are ejected from the capsule and may be thrown up to 1 m from the plant. Regeneration would only appear to take place from seed and normally only after fires. The leaves have an odour reminiscent of cedar when crushed.

VARIATION

In this species there is some variation in the size of the leaves, those of *Esterhuysen* 23254 being the largest, but with the small amount of material available from only a few populations it is impossible at this stage to make any critical observations.

DISCUSSION

This plant may be regarded as a typical *Euchaetis*. It complies with the following criteria: *Flowers* aggregate. *Petals* transversely bearded. *Staminodes* rudimentary. *Anther* with a minute apical gland. *Disc* exceeds the ovary. *Stigma* capitate. *Style and filaments* short and glabrous. *Ovary* 5-carpellate. *Fruit* fairly short-horned.

E. scabricosta is a distinct species and, although it might seem rather like *E. burchellii* Dümmer, which also has opposite leaves, it differs in many ways. For example the leaves are shortly petiolate not sessile; they possess a single row of gland dots along the midrib not two rows, one on either side; the bracts, bracteoles and calyx lobes are all much larger; the fruits have longer horns. But above all, the leaf possesses a prominent rough midrib, a character which is referred to in the epithet *scabricosta*. *E. scabricosta* is more closely related to an undescribed species of *Euchaetis* which is found on limestone somewhat nearer to the sea coast. This species, which I propose to describe in a later paper, was considered to be conspecific with *Acmadenia lacvigata* B. and W. by Sonder (1860). It has a midrib with fewer gland dots, leaves that are more obtuse, more crooked, shorter and broader and the flower heads may be resinous. These two plants occupy adjacent but different habitats, one upon hard sandy ground and the other upon limestone outcrops where the soil has a much higher pH.

ACKNOWLEDGEMENTS

In the preparation of this paper I wish to acknowledge with deep gratitude the assistance of Dr. T. T. Barnard, of the Compton Herbarium, in elucidating a host of problems in connection with the typification of Linnaean material, and also that of Dr. J. P. Rourke, Curator of the Compton Herbarium for, amongst other things, his assistance and advice in correcting the manuscript.